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Possible Links Between Self-Awareness and Inner Speech

Theoretical background, underlying mechanisms, and empirical evidence

Abstract: *A neurocognitive and socioecological model of self-awareness has been recently proposed (Morin, 2003; 2004). The model takes into account most known mechanisms and processes leading to self-awareness, and examines their multiple and complex interactions. Inner speech is postulated to play a key-role in this model, as it establishes important connections between many of its elements. This paper first reviews past and current references to a link between self-awareness and inner speech. It then presents an analysis of the nature of the relation between these two concepts. It is suggested that inner speech can internally reproduce and expand social and physical (ecological) sources of self-awareness. Inner speech can also create a psychological distance between the self and mental events it experiences (thus facilitating self-observation) it can act as a problem-solving device where the self represents the problem and self-information the solution, and can label aspects of one's inner life that would otherwise be difficult to objectively perceive. Empirical evidence supporting the role of inner speech in self-awareness is also presented.*

I: Introduction

An impressive body of knowledge on self-awareness has gradually emerged these last forty years. The main short-term effects (e.g., self-evaluation) and long-term consequences (e.g., self-concept formation) of situational self-awareness have been identified (see Carver, 2002; Silvia and Duval, 2001). A host of measures have been developed to assess dispositional self-focus and have led to conceptual reformulations of 'self-consciousness' (e.g., Fenigstein, Scheier and

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Buss, 1975; Trapnell and Campbell, 1999). Psychologists are examining related abilities such as modeling others' mind ('Theory-of-Mind' development — e.g., Frith and Happe, 1999; Garfield, Peterson and Perry, 2001) and animal self-rec-ognition (e.g., Gallup, Anderson and Shillito, 2002; Mitchell, 2002). And recent research is looking at self-conscious emotions (e.g., Joireman, 2004) and brain areas mediating self-awareness (e.g., Johnson *et al.*, 2002; Keenan, 2003).

The current state of knowledge makes it clear that self-attention is central to our understanding of the self and related constructs (e.g., self-efficacy, self-schema, self-presentation, self-adaptation) because these all involve think-ing reflectively about oneself (Leary and Tangney, 2002). What is needed now is a comprehensive model of self-awareness that simultaneously considers all pos-sible mechanisms and processes leading to it, and their multiple and complex interactions. Although some investigators have already formulated more encom-passing views of self and self-awareness (e.g., Burns and Engdahl, 1998a, 1998b; Mischel and Morf, 2002; Stuss, Picton and Alexander, 2001), these tend to focus on isolated developmental, neurological or social influences. Morin (2003; 2004) recently proposed a more global model that attempts to integrate most neurological, social, ecological, and cognitive factors leading to self-awareness. More specifically, the model proposes the existence of three main sources of self-awareness: the social environment, the physical world, and the self. The social milieu comprises early face-to-face interactions, reflected appraisals, a social comparison mechanism leading to perspective taking, and the presence of other persons observing the self. The physical environment contains objects that foster self-world differentiation in infants, and self-focusing/reflect-ing stimuli such as mirrors, video cameras and photographs of the self, and also, by extension, written material printed in books and articles, as well as various media sources — e.g., television programs and news, the internet, and movies. These information sources induce self-awareness because they encourage per-spective taking. And finally, the self can learn about its body through proprioception and reflect upon itself with cognitive processes, especially inner speech and imagery. In addition, self-awareness requires the participation of specific brain structures, mainly the prefrontal lobes. Numerous links can be established between all these various sources of self-information. The model represents a highly dynamic system where most elements affect and stimulate one another. For instance, within the self, inner speech and imagery (both cogni-tive factors) can internally reproduce social mechanisms responsible for self-awareness, and physical stimuli found in one's physical environment (e.g., books) can extend perspective taking originally motivated by social interactions.

Although all ecological, neurological, social, and cognitive factors are seen as important contributors to self-awareness, the most important one is postulated to be inner speech: without this cognitive process many parts of the model become isolated and its internal consistency greatly suffers. In this paper I exclusively focus on inner speech and provide a theoretical background that includes defini-tions, the hypothesis of a relation between self-talk and self-awareness, qualifi-cations, and a review of past allusions to the hypothesis. This is followed by an

analysis of the exact nature of the links between these two key notions, and by the presentation of the available empirical evidence supporting the view that inner speech is associated to self-awareness.

II: Theoretical Background

The term 'self-awareness' first needs to be carefully defined because the model proposed by Morin (2003; 2004), and the role it ascribes to inner speech, only applies to this sophisticated form of consciousness. 'Self-awareness' in this paper refers to the capacity to become the object of one's own attention (Duval and Wicklund, 1972), where the individual actively identifies, processes, and stores information about the self. It includes the end result of this processing and storing—self-knowledge, the overall information one has about oneself. Self-awareness involves attention paid to one's own mental states (such as perceptions, sensations, attitudes, intentions, emotions, etc.) and public self-characteristics (which include behaviours and general physical appearance). Quite a few closely related notions and variations of self-awareness can be found in the literature: private and public self-consciousness, meta-consciousness, meta-cognition, higher-order thought, autonoetic or extended consciousness, second-order consciousness, reflective awareness, access consciousness, and narrative self (see Gallagher, 2000; Schooler, 2002). Lower forms of consciousness that the model does not address are immediate self-awareness, visceral, first-order and phenomenal consciousness, and the minimal self. (For a review of levels of consciousness, see Morin, 2005.)

Inner speech is usually defined as the activity of silently talking to oneself (Zivin, 1979). Initial theoretical accounts of inner speech can be traced back to Plato (Chiesa, 1991). Other equivalent expressions found in the literature are self-talk, subvocal speech, internal dialogue or monologue, utterances, self-verbalizations, and self-statements (Burnett, 1996). The term 'private speech' refers to speech for self verbalized out loud by adults (Flavell, 1966), whereas 'egocentric speech' was used by Piaget (1923/1926) and Vygosky (1934/1962) to designate children's overt self-verbalizations emitted in social situations without any preoccupation of being understood or of trying to adapt their discourse for others. Inner speech serves many functions. It has been shown to be involved in verbal self-guidance and self-regulation (e.g., Harris, 1990), problem-solving (e.g., Roberts, 1979), planning (Meacham, 1979), and memory (Sokolov, 1972); some psychological disorders such as anxiety and depression would be mediated by dysfunctional self-talk (e.g., Beazley *et al*., 2001). (For a review, see Kendall and Hollon, 1981.) Current work is examining the neuroanatomical basis of inner speech (e.g., Shergill *et al*., 2002), measurement issues (e.g., Lodge, Tripp and Harte, 2000), inner speech in bilinguals (Larsen *et al*., 2002), the incidence and functions of private speech in adults (Duncan and Cheyne, 1999), and connections between movies and inner speech (Wiley, 2004).

One potential function of inner speech that has been neglected in the past is its role in self-awareness and the acquisition of self-information (Morin and

Everett, 1990). When one talks to oneself one can verbally identify, process and store data about one's current physical and mental states as well as past or present behaviours. One view of consciousness (e.g., Carruthers, 1998; 2002) suggests that one becomes aware of a mental state when one generates a higher-order thought about that state. This position is congruent with the present proposal: one becomes self-aware when one engages in self-talk (higher-order thought) about one's current mental states and personal characteristics. Three main causal directions between inner speech and self-awareness are conceivable and equally plausible: inner speech (1) precedes (causes) self-awareness; (2) parallels (accompanies, and possibly sustains) a state of self-awareness; and (3) is triggered by self-focus. Also, a more general state of consciousness, or wakefulness, most certainly represents a prerequisite for inner speech (Morin, 2001): one has to be awake and conscious in order to talk to oneself. Moreover, without a conscious subjective experience the self would not have much to talk about.

It should be noted that people can engage in dysfunctional self-talk, distort or deny self-information, and thus misrepresent their self-concept for self-enhancing purposes (Sedikides and Gregg, 2004). For instance, the anorexic may state that 'I'm too fat', or the narcissistic person may say to himself or herself that 'I'm the greatest' despite contrary evidence. Thus, although in this paper inner speech is seen as a powerful cognitive process enabling (or at least accompanying) self-awareness, it is also recognized that in some pathological conditions it may not lead to accurate self-knowledge. Said differently: I postulate here that if one does *not* use inner speech for introspective purposes one will impede self-awareness development; if one does extensively talk to oneself about oneself one will most probably generate a rich and well articulated self-concept. But this is not automatic, as one can verbally lie to oneself by using self-talk. Inner speech must contain some basic qualities to foster genuine self-knowledge, some of which will be described in the next section. (See Morin, 1995b, for an extensive discussion, and Fields, 2002, or Manson, 2002, for views proposing that inner speech actually seems non-optimal as an internal communication medium.)

The question of the role played by language in consciousness is gaining increasing attention in psychology. Although philosophers and psychologists have seldom connected inner speech — as opposed to language *per se* — to consciousness in the past (Blachowicz, 1999; Kinsbourne, 2000), one can find some allusions to such an association in the literature. Table 1 presents a sample of past and current references to a link between language (and in some cases inner speech) and consciousness, including higher forms of it (i.e., self-awareness). Note that a new emerging field in psychology, Narrative Theory, specifically examines the role of language in the construction of the self (see Budwig, 2000; Davies and Harre, 1997; Gallagher, 2003; Phillips, 2003; Shotter, 1997).

Mead (1912/1964) extensively wrote on inner speech and self-awareness. His central tenet in that respect was that one function of private speech in early childhood is to make young speakers aware of their actions and of their own separate existence. A more recent analysis that bears semblance to the one presented here has been proposed by Burns and Engdahl (1998b):

Table 1

Some references to a relation between self-awareness and language/inner speech

Source	Citation or main idea
Sokolov (1972, p. 1)	'Inner speech [is] a rather important and universal mechanism in human consciousness and psychic activity.'
Dewitt (1975, p. 42)	'The presence of language marks the difference between the presence of self-consciousness and the complete absence of any awareness of self.'
Brown (1976, p. 86)	'The initial distinction of world from self leads, through language, to a distinction of self from the world. The separation of the world leads only to a consciousness of the world and of self QUA object in that world. Self-awareness requires a further differenciation within self — language fulfills this need.'
Popper and Eccles (1977, p. 553)	'The origin of the self-conscious mind somehow goes together with the origin of language.'
Dimond (1980; cited in Miller, 1991, p. 224)	'Human mental life is normally dominated by an ongoing interior monologue that is closely linked to the productive capacity for language and forms the basis for the generative mechanism of self.'
Berger and Schuch (1981)	At the end of the first year of life, significant prerequisites of self-consciousness have evolved. The influence of language on this process is crucial.
Kaufman and Raphael (1984)	One relates to the self with inner dialogue.
Jaynes (1986, p. 137)	'How can you know yourself [self-awareness] unless you have an analog 'I' [inner speech] narratizing in a mind-space and reminiscing or having episodic memory about what you have been doing and who you are?'
Gillett (1987; cited in Natsoulas, 1991)	Propositional attitudes [language, inner speech] are necessary for a full self-consciousness.
Nurius and Majerus (1988)	One can rethink the self in self-talk.

Dennett (1991)	The self is a 'center of narrative gravity' — a [verbal] autobiography.
Miller (1991, pp. 227–8)	'The left-hemisphere verbal autoarticulatory capacity [inner speech] operates… both to guide behavior and to appraise feedback from that behavior's impact on the physical and social worlds. In this way is self-knowledge progressively developed and an identity hewn from the emotion-perception activity melange of successive daily experiences.'
Flanagan (1992, p. 194)	'Being self-conscious requires that we engage in a temporally extended soliloquy.'
McCrone (1995, p. 29)	'Humans can use inner speech to call to mind previous states of awareness; previous thoughts, feelings and actions. We can live the moment, then relive it, creating an eerie illusion that consciousness is also conscious of itself.'
Carruthers (1996)	Much of the stream of human consciousness is occupied with inner speech, or with imaged sentences (spoken or heard) of natural language.
Weiskrantz (1997)	Patients with self-awareness deficits can no longer 'comment' on [talk to themselves about] their defective skills.
Simonov (1999, p. 380)	'The communicative origin of consciousness is the source of the capacity to hold a meaningful dialogue with oneself, i.e., it produces self-awareness.'
Briscoe (2002)	While some contend that language is important for higher states of consciousness, it can be proposed that it is not language *per se* that is essential, but rather inner speech, our ability to converse with ourselves.
Stamenov (2003, p. 76)	'Inner speech… serves as a sublest (and, in a sense, ultimate) vehicle of online maintained self-awareness.'
Steels (2003, pp. 183–4)	'[Grammatical language] can also be used as a way to 'listen to oneself', in other words to have an inner voice through which a self-model can be constructed and tested.'
Turk *et al.* (2003)	The 'interpreter' represents a left-hemispheric [verbal] cognitive sub-system which is responsible for explaining our own behaviour [self-awareness].

The naming of states — and languaged-based conceptualizations of states — play a key role [in self-awareness] (p. 176); through a process of labeling, categorizing, and engaging in language-based modes of representation [inner speech], a person not only represents internal states and experiences (sentience) but acquires the capacity to reflect on them (p. 179). Reflections can be communicated and discussed with self in inner dialogues as well as with others. … Without language [internal monitoring remains] relatively primitive, vague, unelaborated. (p. 171)

III: Underlying Mechanisms:
Nature of the Link between Inner Speech and Self-Awareness

1. Inner speech and the social milieu

The question then becomes: In what way exactly does talking to oneself give access to self-information? Or: What is the nature of the relation between inner speech and self-awareness? One first answer is that self-talk can reproduce social mechanisms leading to self-awareness. If social processes are shown to induce self-focus, and inner speech to replicate these processes, then inner speech itself has the potential to produce, or at least facilitate, self-awareness. Note that since people enter social situations with self-knowledge, it would probably be misleading to state that inner speech *leads* to an acquisition of self-information. Rather, self-talk would extend already existing self-knowledge.

As stipulated by the self-awareness model (Morin, 2003; 2004), the social environment represents a rich source of self-information and can in different ways initiate self-focus. Two theorists explored this notion in detail: Charles Horton Cooley and George Herbert Mead. Cooley (1902) basically proposed that people regularly comment on (verbal feedback — e.g., 'you are intelligent'), or react to (non-verbal feedback) our personal characteristics and behaviours. These reflected appraisals allow one to learn about oneself and can also induce self-awareness. One can also engage in sophisticated conversations with significant others and discuss one's personality characteristics and typical behavioural patterns. This feedback can also be non-verbal — people smile at, look angry at, or ignore one another; one uses this information to develop a self-view.

Mead (1912/1964; 1934; 1982) suggested that confrontations with others can compel the individual to take others' perspectives in order to gain an objective point of view on himself or herself. Once in this position, the individual would become self-aware and could acquire self-information. Said differently: in the social environment one is constantly presented with other ways of thinking, feeling, or behaving; one perceives differences between these elements and what one typically does, thinks or feels. This motivates one to take other persons' perspective and to develop an objective vision of oneself and to examine one's own intellectual, emotional, and behavioural patterns. For example, a person could learn that he or she is patient (perspective taking and acquisition of self- information) after observing someone else being rude and impatient in a social setting (confrontation), concluding that he or she would never behave that way in such a situation.

With inner speech one can engage in verbal conversations with oneself and replicate comments emitted by others (Cooley's mechanism) or internalize others' perspective (Mead's mechanism). Interpersonal modes of acquisition of self-information can become *intra*personal means of self-communication (Morin, 1993). As Burns and Engdahl (1998a) state, 'The activity of talking about and reflecting upon oneself, while socially generated, becomes an individual, subjective experience' (p. 70). Luria (1978) proposed that the organization of the brain's higher functions has been shaped by the social environment in which it evolved. In this perspective, it can be suggested that the social world is a necessary but insufficient condition for the emergence of self-awareness. For example, one's motivation to communicate with others might very well be social in origin, but it has to be mediated by cognitive (linguistic) processes in order to manifest itself effectively. By the same token, once initiated by the social environment, self-awareness would then need to be taken over and extended by cognitive processes. Without these mental operations reproducing what is taking place in the social world (i.e., if one was only to have social interactions as a source of self-information), one could hardly become self-aware outside social situations (Morin and DeBlois, 1989).

As previously stated, with self-talk one can reproduce for oneself appraisals one gets from others. Observations and inferences about one's thoughts, feelings and behaviours made by others might imprint on one's own inner speech a propensity to address to oneself such remarks. Although direct evidence to this effect is presently lacking, Burnett (1996) suggests that what significant others say to children influences their self-talk. More specifically, children who perceive that significant others talk positively to them appear to have higher positive self-talk and lower negative self-talk than children who report that significant others say negative things to them. In addition, children who perceive that significant others say negative things to them appear to have higher negative self-talk and lower positive self-talk than children who report that significant others say positive things to them. It thus seems plausible to suggest that a mode of transmission of self-information that is originally interpersonal (verbal comments made by others about oneself) could gradually become *intra*personal (verbal comments about oneself that are addressed to oneself) — e.g., 'I am intelligent, or stupid.'

Social feedback can sometimes be inaccurate, in which case the individual is likely to resist incorporating the information into the self-concept. Eichstaedt, Leippe, and Rivers (2002) examined factors determining up to what extent people will accept or reject others' feedback as being self-relevant and incorporate it—or not—into their self-image. They note that '(…) incoming information about the self is initially comprehended and believed … and results in positive or negative affect consistent with the valence of the trait information. This minimally cognitive stage is followed by *reflective scrutiny* involving comparison with a multi-faceted self-concept …' (p. 290; italics added). This reflective scrutiny almost certainly means talking to oneself. For example, one could be accused of missing work because of laziness; such a remark could indeed apply,

but if not, the reflective scrutiny mentioned by Eichstaedt *et al.* could be activated: 'I'm not lazy — I was sick in bed.'

Inner speech can also reproduce Mead's perspective taking mechanism. Talking to oneself can initiate a fictional dialogue where verbalizations of an objective, and thus different point of view about oneself is possible. One sometimes engages in self-talk in which one states to real or imaginary persons one's motives for behaving in a given fashion or for having some personal characteristics. When, in response to the expected reactions of others, one explains one's actions or describe oneself in self-talk, one takes others' perspectives into consideration and thus gains a relatively objective view of oneself. For example, one might say to oneself: '*X* might wonder why I ignored her yesterday' [objective vision of oneself produced by the anticipation of the response of another person]. 'The reason is that I'm still angry at her' [acquisition of information about one's emotions].

Morin's self-awareness model (2003; 2004) also suggests that another social factor leading to self-awareness is the presence of other persons observing the self. Research indicates that being in front of an audience that is actively observing the self fosters self-focus (Carver and Scheier, 1978; Diener, 1979; Diener, Lusk, DeFour and Flax, 1980). Being scrutinized by only one person is enough to produce self-awareness (Buss, 1980). This social mechanism can also be reproduced and extended by self-talk. For example, a person who just gave a conference could start talking to herself on her way home: 'Was my speech any good? I remember seeing *X* [a colleague] looking at me in the audience. I wonder what he/she thought about it [perspective taking and objective vision of oneself]. I was nervous at first but gradually became more at ease' [acquisition of self-information].

2. *Inner speech and the physical environment*

Yet another source of self-awareness, according to the model, is the physical world. It contains self-reflecting stimuli such as mirrors, video cameras, recordings of one's voice, and pictures of the self that provide important information about the public self—facial features and expressions, mannerisms (e.g., way of walking, talking, smiling), tone of voice, body height and weight, skin tone and completion, hairstyle, etc. Such characteristics are significant because they (partially) define our personal identity (see Cole, 1999), and without self-reflecting stimuli one would not have direct access to that public self-information. Inner speech is likely to become active when people get exposed to self-reflecting devices and intently examine the public self: 'I look very good today', 'My skin is pale', 'I'm gaining weight', etc. One can propose that *verbally describing* the physical self, as opposed to simply *seeing* the self in a mirror, on video, or on a photograph, allows for a better perception of the information and integration of it into the self-concept.

Another set of physical stimuli that can produce self-awareness is written material found in books and articles, the media (written material such as

newspapers, as well as television programs and news), the internet, radio, CDs, and movies (including videotapes and DVDs). The aforementioned stimuli present a host of views and behaviours (and indirectly at least, underlying motives, values, attitudes, emotions, etc.) that are potentially different from one's own current beliefs and actions. Such confrontations are likely to trigger perspective taking and self-observation (Mead's thesis), as well as self-talk. For example, one might verbalize to oneself: 'This person [in the news] put his life in danger to save a drowning puppy. I would never do that — I'm too cowardly.'

3. Other underlying mechanisms

I argued in the previous section that inner speech can reproduce social feedback, internalize others' perspective and audience presence, and get activated when one is exposed to self-reflecting devices and other objects in one's physical environment. The following three complementary analyses can also clarify the nature of the relation between self-talk and self-awareness.
Johnstone (1970, p. 106) states that:

> A subject completely immersed in experience would not be conscious of it. It is a platitude that we are indeed unconscious of most of the background noises, pressures, luminosities, odors, and visceral sensations that impinge upon us at any given moment. We are unaware of them not because they are remote but because they are too near. There is no distance between us and them.... a person can be conscious of something only if a wedge has been inserted between him and it.... In complete immersion in experience there is no sense of ownership.

What this citation suggests is that an observation is possible *only if* there exists a *distance* (a wedge) between the observer and the observed thing. By extension, *self*-observation is possible only if there exists a gap between the individual and any potentially observable self-aspect. With perspective-taking people can operate a backward movement and create a (mental) distance within the self. Inner speech can also produce a *redundancy* (or *re*presentation) of self-information, and this redundancy in turn generates a distance within the self (Morin, 1993). The term 'redundancy' implies that some already existing information is brought under a new form (Robert, 1973). To illustrate — a person might experience an emotion of anger; this mental state represents a potential bit of self-information. Then the person might verbally analyse this occurrence and say: 'I am really mad!' Here a replication of the emotion takes place (the person is simultaneously *feeling* anger and *talking* to him/herself about it), so that the information (raw emotion) is brought under a new form (verbal description). The individual, before the redundancy, was *immersed* in his or her subjective experience; after the redundancy created by self-talk, he or she now has access in his or her perceptual field to self-information to which he or she did not have access previously. The distance produced by the redundancy, itself caused by self-talk, is what would make self-observation and the acquisition of self-information possible. The individual not only is experiencing anger — he or she *knows* that this experience is taking place. Note here that the dialogical nature of inner speech, in

which an individual will ask a question and then answer it (see Blachowicz, 1999), implies a duality of agency in the conversation that fits well with the present 'distance' proposal.

A second way to look at the role played by inner speech in self-awareness is to conceive the process of self-reflection as being a problem-solving task, and self-talk as being a cognitive tool the individual uses to reach a 'solution' to this 'problem' (Morin, 1995b). In other words, the self can be seen as a question to be solved (i.e., Who am I? What characterizes me? What behaviour did I emit?), where the solution represents self-knowledge, and self-information, the data needed to work out the problem. Past research on inner speech indicates that talking to oneself while trying to solve some types of problem (e.g., puzzles) significantly facilitates the process. For instance, Kendall and Hollon (1981) proposed four categories of self-statements that assist the process of problem-solving: (1) self-verbalizations allowing the formulation of a clear definition of the problem ('OK. What's the problem? What I am suppose to do?'), (2) self-verbalizations promoting an effective approach to the problem ('I should find a strategy to solve this problem.'), (3) self-verbalizations enhancing focus on the problem ('No, that's not important. I must focus on *this* instead.'), and (4) evaluative self-statements to praise oneself when a solution is reached ('Good! I did it!') or when one needs to readjust one's strategy ('No, that's no the way to go. That's OK — I must try again and do *that* instead.')

Talking to oneself about oneself using these four categories of self-statements is likely to increase self-awareness (the 'problem'). To illustrate, a person might engage in the following soliloquy: 'How did I react [in a given situation] [clear definition of the problem]? I should try to remember exactly what happened and everything I did [effective approach to the problem]. The first thing I did was *Z*. Then *X* happened, and I reacted by saying *W*. Good! I'm getting somewhere! [reinforcing self-verbalization] I don't need to take *G* [a given event] into consideration because it's not important. What's important is how I reacted [focus of attention on the problem]. OK. So I said *W*. What did *H* [another person] say? No! That's not pertinent — I need to take my time and think more [readjustment of one's strategy].'

A third possible view of the nature of the relation between inner speech and self-awareness is that language allows to verbally label self-aspects (McCrone, 1999; Zelazo, 2004). This would greatly facilitate the identification of self-information, especially more abstract and conceptual material (Morin, 1995b). A weak version of this idea states that talking to oneself and naming self-dimensions make these more salient and visible. Without language, emotional responses, physiological sensations, values, attitudes, goals, etc. would still be perceptible but more 'diffuse' or 'out of focus.' In other words, one could be aware of feeling hungry without having to say to oneself 'I am hungry', but one would perceive hunger more acutely (and possibly more intensely) if one would talk to oneself about this physiological sensation. A stronger account proposes that one could simply not be aware of some self-aspects without naming them. Indeed, how could one realize that one is holding anti-semitic attitudes or

hedonistic values without having to verbally label these by saying to oneself 'I believe in antisemitism / hedonism?'

Language also makes it possible to use a rich vocabulary about oneself and to better differentiate between subtle self-aspects. One can say to oneself 'I feel tired'; but one can also utter 'I don't simply feel tired — I feel sleepy, drowsy and exhausted,' in which case one's subjective experience will be significantly deepened by the use of a sophisticated vocabulary about oneself. One can describe oneself as being 'intelligent', or one can employ adjectives such as 'quick', 'sharp', and 'clever' to portray oneself; better self-understanding is likely to be the result.

IV: Empirical Evidence

The last part of this paper consists in an examination of the available empirical evidence supporting the existence of a link between inner speech and self-awareness. Neuropsychological evidence tends to corroborate the view put forward here. It is a well known fact that the left hemisphere of the brain is specialized in language (e.g., Gazzaniga, 1970; Gazzaniga and Sperry, 1962), and thus it very likely sustains inner speech. Recent neuroimaging studies indeed confirm this assertion. One precise area of the left hemisphere, the inferior frontal gyrus, has been shown to be more active in participants who are asked to silently articulate sentences (McGuire, Silbersweig, Murray, *et al.*, 1996) or single words (McGuire, Silbersweig, Wright, *et al.*, 1996). Studies of brain damaged patients support these findings: destruction of Broca's area in the left hemisphere (Verstichel, Bourak, Font and Crochet, 1997) or of the left posterior and anterior frontal regions (Levine, Calvanio and Popovics, 1982) disrupt inner speech.

There is considerable controversy in the literature about the localization of self-awareness in the brain. The consensus is that the prefrontal lobes play a central role (Stuss et al., 2001), but some believe that the right hemisphere is dominant for self-awareness (e.g., Keenan, 2003), whereas others think it is mainly located in the left hemisphere (e.g., Kurk *et al.*, 2003); yet other propose that self-awareness is scattered throughout the brain (e.g., Kircher *et al.*, 2002). Although some self-related processes such as self-recognition and Theory of Mind seem primarily located in the right hemisphere (e.g., Keenan, Nelson, O'Connor and Pascual-Leone, 2001—but see Turk *et al.*, 2002; Stuss, Gallup and Alexander, 2001—but see Gallagher and Frith, 2003), many others are bilateral or located in the left hemisphere. To illustrate, the capacity to describe the self most likely involves both hemispheres of the brain. In a standard experiment, volunteers are asked to judge how well personality traits, abilities, attitudes, or physical attributes describe them while brain activity is being measured. Results of such experiments reliably show bilateral frontal activation (e.g., Craik *et al.*, 1999, Gusnard *et al.*, 2001; Johnson *et al.*, 2002; Kelley *et al.*, 2002; Kircher *et al.*, 2000, 2002; Kjaer, Nowak and Lou, 2002). The capacity to remember one's own past (autobiographical memory) seems to be more lateralized in the left hemisphere. Recent PET and EEG studies show important

left frontal activation in participants asked to recall specific personal events (Conway and Turk, 1999; Conway, Pleydell-Pearce and Whitecross, 2001).

Since portions of the left prefrontal lobe are both associated with self-reflective activities (i.e., self-awareness as defined in this paper) and inner speech, then it supports the notion that the latter participates in self-awareness (Morin, 2002; Steels, 2003). It comes as no surprise then that loss of inner speech following brain damage leads to self-awareness deficits. Moss (1972), a clinical psychologist who suffered from a stroke but recuperated from aphasia, relates his experience:

> The second week [at the hospital] I ran into a colleague who happened to mention that it must be very frustrating for me to be aphasic since prior to that I had been so verbally facile. [I] later found myself why it was not. I think part of the explanation was relatively simple. If I had lost the ability to converse with others, I had also lost the ability to engage in self-talk. In other words, I did not have the ability to think about the future — to worry, to anticipate or perceive it — at least not with words. Thus for the first four or five weeks after hospitalization *I simply existed*. So the fact that I could not use words even internally was, in fact, a safeguard. (p. 10; italics added)

Consistent with this is the observations related by Helen Keller of the time before she was taught a language (and presumably lacking inner speech). She states that 'Before my teacher came to me, I did not know that I am. I lived in a world that was a no world... When I learned the meaning of 'I' and 'me' and found that I was something, I began to think. Then consciousness first existed for me' (cited in Salzen, 1998, p. 307). Here one can equate the term 'consciousness' used in the citation with 'self-awareness' since Keller clearly indicates that a lack of it meant she did not know that she existed. Ojemann (1986, p. 161), who treated patients suffering from cortical damage, observes: 'As recovery occurs, conscious experience returns as well. It seems to return in parallel with the phenomenon of inner speech. Inner speech may be limited, restricted, concrete, foggy, not normal after these kinds of lesions, but at least conscious experience has come back.' Note that this second citation is unclear as to the exact meaning of 'conscious experience' — 'consciousness' or 'self-awareness'.

Five independent studies using various measures of self-talk and self-awareness support the hypothesis of a correlation between these two mental activities. Overall, they suggest that the more one focuses on the self the more one talks to oneself (about private self-aspects), and vice-versa. In an exploratory study, Morin (1992) asked French-speaking participants to fill-in questionnaires assessing inner speech and private self-consciousness. Private self-consciousness is defined as one's more or less important tendency to examine covert self-aspects; it can be measured with the Private Self-Consciousness Subscale (PrSC) of the Self-Consciousness Scale (SCS) (Fenisgstein *et al*., 1975). Two representative items of the PrSC are 'I'm generally attentive to my inner feelings' and 'I reflect about myself a lot.' The SCS has been shown to have good discriminant validity and reliability (see Carver and Glass, 1976); many variations of the original scale have been constructed over the years (e.g., Burnkrant

and Page, 1984) and the PrSC has recently been reconceptualized by Trapnell and Campbell (1999) into self-reflection and self-rumination (see below).

In Morin's study (1992) private self-consciousness was measured with a validated French version of the PrSC (Rimé and LeBon, 1984). Inner speech was assessed with a French pilot questionnaire evaluating various functions of self-talk — e.g., memory, problem-solving, imagination, verbal self-regulation, and self-observation. Translated examples of items of this scale are 'I verbalize to myself what I feel inside' and 'Before leaving home I produce a verbal list of things I need to take with me.' A significant correlation of .46 was found between inner speech and private self-consciousness. In a second study, Morin, Everett, Turcotte, and Tardif (1993) again measured private self-consciousness with the French version of the SCS mentioned above and used a validated questionaire to assess inner speech. More specifically, Morin *et al*. (1993) developed the Self-Observation Auto-verbalizations Inventory (SOAI), explicitly designed to measure the activity to talk to oneself *about oneself*. Thus the SOAI offers a direct operationalization of self-talk used for introspection purposes; as well, it possesses sound psychometric qualities. Translated examples of typical items are 'I feel (jealous, arrogant, sensitive, insecure, etc.). What's making me feel like that?' and 'Why did I behave that way?' Here too a significant .46 correlation was observed between the SOAI and the PrSC. Rivest and Khawaja (1995) replicated this study and found the exact same correlation. Morin (1995a) also observed a significant and positive correlation between the SOAI and a 'Who am I' measure of self-concept complexity.

Siegrist (1995) developed a German self-talk scale measuring inner speech about the self, e.g., 'I often talk to myself about happenings or experiences that are crucial to me.' Preliminary results indicate that the Scale for Inner Speech (SIS) has good internal consistency. Siegrist also measured private self-consciousness with a validated German version of the PrSC and obtained a significant correlation of .48 between the PrSC and the SIS. In another study, Schneider (2002) assessed inner speech with a shorter version of the SIS and private self-consciousness with a validated German translation of Burnkrant and Page's measure of self-reflection (1984). Self-reflection represents a non-anxious, healthy form of private self-consciousness—a genuine curiosity about the self, where the person is intrigued and interested in learning more about his or her emotions, values, thought processes, attitudes, etc. Schneider observed a significant .51 correlation between inner speech and self-reflection. In a more recent study, Schneider, Pospeschill and Ranger (2003) also found a significant .56 correlation between the same measures.

V: Conclusion

Morin (2003; 2004) recently offered a multidimensional view of self-awareness. The model portrays self-attention and the resulting acquisition of self-information as complex, multifaceted phenomena shaped by a host of ecological, neurological, social, and cognitive processes. In this paper one factor in particular has

been examined — inner speech, which is postulated to play a fundamental role because half of the links that can be drawn between various elements of the model pertain to it. It has been proposed here that the self can reflect upon itself by verbally communicating with itself. Inner speech can internally reproduce and extend social and physical sources of self-awareness. If one did not have the capacity to talk to oneself, self-awareness would only be possible in the presence of others or when confronted to physical stimuli. Even then, most perceived self-information could hardly be cognitively processed. Inner speech can also create a psychological distance between the self and mental events it experiences—thus facilitating self-observation—, can act as a problem-solving tool where the self represents the problem and self-information the solution, and can label aspects of one's inner life that would otherwise be difficult to objectively perceive. One can compare inner speech to a flashlight used to find one's way through a dark room (Morin, 2001). Without the light one will still be capable of approximate perception (e.g., one can utilize touch to discern furniture and objects [self-information] in the room); but perception (self-awareness) will be much more vivid and precise if one puts the flashlight on.

As previously mentioned, what we need now are conceptual systems that simultaneously look at all possible mechanisms and processes leading to self-awareness, as well as their numerous and intricate interactions. Such comprehensive — and thus more realistic — views of self-awareness will undoubtedly increase our understanding of this experience and of what makes us uniquely human. A close analysis of the role played by inner speech in self-awareness hopefully brings us a little closer to these goals.

Author Note

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